TRAILER WITH HOIST FOR CONTAINER AND THE LIKE

Field of the invention

The present invention is directed to a trailer which can load and unload a container at a given location.

Background of the invention

It is well known in the art to make use of shipping containers to transport goods from one place to another.

Typically, containers are loaded and unloaded from trucks, train beds, etc. at locations where special cranes are located. However, this has the disadvantage of being able to place a container only at locations which are so equipped with the equipment.

In the agricultural field, it would be advantageous to have a container on site during harvesting, to avoid a plurality of manipulations and transport solutions. However, the cranes that are typically used to move containers are expensive to build, maintain and operate, and it is unrealistic to think that a farmer or cooperative can afford such a piece of equipment.

Summary of the invention

It is an object of the present invention to provide a trailer equipped with a hoist, to load and unload a container at a location. In accordance with the invention, this

object is achieved with a trailer for transporting a container, said container being provided with lifting holes at least at each corner thereof; said trailer comprising:

a generally U-shaped frame, the front thereof being provided with means for removably attaching said trailer to a tractor, said generally U-shaped frame being shaped and sized to receive said container within said frame, said frame being provided with wheels on each side of said frame;

a plurality of retractable lifting members, each retractable lifting member being positioned proximate a lifting hole of said container when said container is received within said frame, said retractable lifting members being movable between an inoperative position where said lifting members are disengaged from said lifting holes, and an operative position where said lifting members engage said lifting holes and are extendable to lift said container; and

means for controlling said plurality of lifting members.

Description of the drawings

The present invention will be better understood after reading a description of a preferred embodiment thereof made in reference to the following drawings in which:

Figures 1(a), 1(b) and 1(c) are respectively side, top and rear views of a trailer according to a preferred embodiment of the invention, with a container on the ground being ready for lifting;

Figures 2(a), 2(b) and 2(c) are respectively side, top and rear views of the trailer of Fig. 1, with the container lifted and ready for transport;

Figure 3 is a schematic representation of the hydraulic system for use with the trailer of Fig. 1;

Figures 4(a), 4(b) and 4(c) are respectively side, top and rear views of the trailer of Fig. 1;

Figure 5 is a cross-sectional view of the support beams of the trailer of Fig. 1 taken along line V-V; and

Figure 6 is a cross-sectional view taken along line VI-VI.

Description of a preferred embodiment of the invention

The present invention is directed to a trailer as illustrated in the accompanying Figures. The trailer is particularly adapted to transport to a location a shipping container. The trailer of the present invention allows transportation, dropping off and picking up of a container in areas where specialised equipment such as cranes, etc. is not present. In a preferred embodiment of the invention, the trailer can be used on site in a field where harvesting is being performed. Without the trailer of the present invention, the container cannot be located *in situ*.

In general terms, the trailer of the present invention has a generally U-shape as illustrated in Figure 1(b), which is a top view of the trailer. At predetermined locations on the frame of the trailer, i.e. the four corners, lifting members are located which are adapted to engage the holes or lifting points provided on a container and to lift the same off the ground by a sufficient amount (approximately 12-48 inches). The trailer is also provided with wheels or endless tracks so that it may be moved once the container has been loaded or unloaded.

Referring now specifically to Figs. 4(a) – 4(c), there is shown the trailer 10 according to a preferred embodiment. The trailer 10 consists of a generally U-shaped frame 11, provided with wheels 13 on each side of the frame 11. In the

illustrated embodiment, the wheel set 13 consists of a walking axle, but any other arrangement of wheels will meet the objects of the present invention.

As can be appreciated, the frame 11 is shaped and sized to receive a container 90 therein, as better shown in Figs. 1 and 2. The container is equipped, as is standard in the industry, with lifting holes located at each corner of the container. These holes are generally located approximately 4 inches below the top of the container.

In a preferred embodiment, the trailer is provided with vertical beams 15 which are located on the trailer so as to be proximate the lifting holes of the container 90. The front beams 15 are interconnected with a top cross member 17 and the rear beams 15 are interconnected with another top cross member 19. The cross beams 17, and 19 serve to increase the stability of the trailer 10.

Within each beam is located a lifting member 30, which consists of a hydraulic cylinder 31 movable between an extended position (right hand side of Fig. 5) and a retracted position (left hand side of Fig. 5).

At the top of the cylinder is located a lifting hook 33. The lifting hook is inwardly biased, so that hooks on the right hand side of the trailer, when looking at the same from the rear are biased in a counter-clockwise direction, and the hooks on the left hand side of the trailer are biased in a clockwise direction (see the arrows on Fig. 5). Preferably, a stop 35 is provided so that motion of the lifting finger is limited in the direction of bias.

The beams 15 are further provided with a longitudinal slot 37 on an inside face thereof. The slot 37 has a predetermined length, the purpose of which will be explained hereinafter.

When the lifting member 30 is in the retracted position, as shown on the left hand side of Fig. 5, the lifting hook is located within the beam 15. This effectively "hides" the hook, and provides the necessary clearance between the beams 15 and the container so that the trailer 10 can be backed up to surround the container, or moved forward to clear the container 10.

When the container is ready to be picked up, as shown in Fig. 1, the container 10 fits snugly within the opening defined by the U-shaped trailer, and the beams 15, and consequently the lifting members, are located proximate the corresponding lifting hole on the container 10.

The hydraulic cylinders 31 are then extended. When the lifting finger 33 reaches the bottom end 39 of the longitudinal slot, it extends out of the beam 15. Preferably, this position is just below the lifting hole on the container 10, to allow the finger 33 to properly deploy.

As the cylinder 31 is further extended, the lifting finger 33 engages the lifting hole of the container, and gradually lifts the container off the ground, until the top of the container reaches the bottom of the top cross members. Thus, the length of the slot 37 essentially corresponds to the distance the container will be lifted off the ground.

This is better shown in Fig. 2, showing the container lifted off the ground and ready for transport.

Figure 3 schematically illustrates the hydraulic circuit for the trailer. One important aspect is that the four cylinders extend and retract substantially at the same rate, to prevent buckling of the trailer 10.

As is usual, the frame 11 is provided with means, such as a fifth wheel, to attach the trailer 10 to a tractor.

In another preferred embodiment, the trailer 10 is further provided with a gate at a rear end thereof, in order to further increase the stability of the trailer, particularly one that has been loaded, and to compensate for torsion loads.

Consequently, the trailer can be used to drop and pick-up a container in a particular location. When the container is ready to be moved, the trailer is approached to the container, the frame is made to engage the holes and the container is lifted off the ground and driven away.

Although the present invention has been explained hereinabove by way of a preferred embodiment thereof, it should be pointed out that any modifications to this preferred embodiment within the scope of the appended claims is not deemed to alter or change the nature and scope of the present invention.